

CLAIMS

1. A method of forming a conductive strap in a semiconductor device, the method comprising:

    forming a semiconductor structure including a source/drain region located in a substrate, a gate located over the source/drain region, and a dielectric spacer located over the source/drain region and adjacent to the gate;

    implanting a semiconductor material into upper surfaces of the gate, the dielectric spacer, and the source/drain region;

    depositing a refractory metal over the implanted semiconductor material; and

    reacting the refractory metal with the implanted semiconductor material, thereby forming a continuous metal silicide strap at the upper surfaces of the gate, the dielectric spacer and the source/drain region.

2. The method of Claim 1, wherein the step of implanting a semiconductor material comprises implanting silicon.

3. The method of Claim 1, wherein the step of depositing a refractory metal comprises sputter depositing cobalt.

4. The method of Claim 1, wherein the step of reacting the refractory metal comprises annealing at a temperature of 800°C or greater.

5. The method of Claim 1, further comprising the steps of:

forming a silicon-blocking layer over the semiconductor structure;

patterning the silicon blocking layer to form an opening which exposes a portion of the gate, the dielectric spacer and a portion of the source/drain region; and

implanting the semiconductor material through the opening.

6. The method of Claim 5, wherein the implanting step is performed at an angle with respect to the opening.

7. The method of Claim 5, wherein the refractory metal is deposited over the patterned silicon blocking layer and into the opening.

8. A semiconductor structure comprising:

a semiconductor substrate;

a conductive element located over the semiconductor substrate;

a dielectric spacer located adjacent to a sidewall of the conductive element; and

a continuous silicide strap located over the conductive element, the dielectric spacer and the semiconductor substrate.

9. The semiconductor structure of Claim 8, wherein the conductive element is a gate electrode.

10. The semiconductor structure of Claim 9, further comprising a gate dielectric layer located between the semiconductor substrate and the gate electrode.

11. The semiconductor structure of Claim 9, further comprising a source/drain region located in the semiconductor substrate, wherein the strap contacts the source/drain region.

12. The semiconductor structure of Claim 9, wherein the gate comprises conductively doped polycrystalline silicon.

13. The semiconductor structure of Claim 8, wherein the dielectric spacer comprises silicon oxide or silicon nitride.

14. The semiconductor structure of Claim 8, wherein the dielectric spacer is silicon-rich.

15. The semiconductor structure of Claim 8, wherein the silicide strap comprises cobalt silicide.